INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1993	**Park:** Shenandoah NP
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Name: Mr Rolf Gubler **Phone:** n/a **Email:** n/a

Permit#:
SHEN1993AGPD

Park-assigned Study Id. #:
unknown

Project Title:
Gaseous Pollutant, Visibility, and Rainfall Monitoring

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1993	**Study End Date** Jan 01, 1993

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Air Quality

Objectives:
Study long-term effects of air pollution.;1. Monitor air quality at SNP including gaseouw pollutants, visibility, and rainfall chemistry.;2. Coordinate air pollution studies related to NPS and other government agencies with emphasis on evaluating air pollution effects on park resources.

Findings and Status:
All USGS Interstate Comparison Studies on the rainfall collection performed since the project's conception have passed quality assurance checks except during July, 1984. These results are excellent. ;The annual average raifall pH since 1981 has ranged from 4.51 to 4.58. However, the summertime average rainfall pH has fallen from 4.48 to 4.32. Because pH is a logarithmic measurement, these ranges are approximately 10 times more acidic than normal rainfall (pH 5.2 to 5.6).;1992 Ozone levels were slightly lower than in 1991, while 1993 levels were higher than 1992 (but not as high as 1991). SO2 was not monitored after January 1993, because levels had remained essentially the same throughout the period monitored (the particulate monitoring and the rainfall monitoring reveals more reliable information about sulfur concentrations and deposition). NO EPA standards for ambient SO2 or ozone were violated in the Park in 1993.;As of 1990 (1991 data not in yet), a preliminary analysis of visibility data which uses three categories of sight distance - good, moderate, and poor - shows a slight increase in visibility when compared to the seasonal yearly average. However, more statistics must be performed to confirm this. Human observer data and transmissometer data (before QA/QC by Denver) between 1991 and 1993 have shown that good visibility days in the summer have remained around 16 percent of the time. However, poor visibility days (excluding foggy days) have increased from 24 percent in 1991, to 31 percent in 1992, to 36 percent in 1993. ;Sulfate monitoring still shows the concentrations at SHEN to be among the highest in the country. A recent paper, TEN-YEAR TRENDS IN SULFUR CONCENTRATIONS AT NATIONAL PARKS THROUGHOUT THE UNITED STATES, by Eldred, Cahill and Malm, found that summertime concentrations of sulfur particulates have increased 4 percent per year from 1982 through 1992.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS:	**Funding provided this reporting year by other sources:**

36700	0
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
n/a	0